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Further research needed: a comment on Coyne & van Sonderen's call to abandon the Hospital Anxiety and Depression Scale

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Coyne & van Sonderen (1) provide a commentary to Cosco et al's systematic review (2) of the Hospital Anxiety and Depression Scale (HADS) that calls for the abandonment of this widely used assessment of psychological distress. This judgement is based mainly on their perception of inconsistent findings with regard to its factor structure. We argue that the inconsistency is due to the hierarchical structure of anxiety and depression and that interpretation of literature from this perspective resolves the issue.

There is actually considerable consistency bearing in mind the statistical method employed. Cosco et al identify 50 studies examining the HADS latent structure: all four of the studies employing item response theory (IRT) support a unidimensional structure; 18 of the 22 (82%) studies employing solely exploratory factor analysis (EFA) support a two-factor anxiety-depression structure; and 16 out of 24 (67%) studies employing confirmatory factor analytic (CFA) support a three-factor structure, with a further 7 (29%) supporting a two-factor structure. Notably, the three-factor structure commonly relates to a tripartite model consisting of autonomic anxiety, anhedonic depression and negative affectivity. It is this implicitly hierarchical structure that hints to the reason for inconsistent findings across methods.

The tripartite theory postulates that the association between anxiety and depression is due to a higher-order 'general trait of somatopsychic distress' referred to as negative affectivity (3). Later work extended this model to include positive affectivity and anxious arousal as further higher-order factors (4) and it is now suggested that all mood and anxiety disorders fall within a complex hierarchical structure (5). The essential point is that we must consider symptoms of anxiety and depression as components of a hierarchical structure that includes a general distress factor.

Studies employing a tripartite structure invoke a higher-order negative affectivity factor onto which anxiety and depression load. An alternative hierarchical structure, referred to as group-factor or bi-factor models, may provide a more appropriate structure closely related to recent extensions of the tripartite theory. This includes a general factor along with orthogonal anxiety and depression factors. The distinction is that in a bi-factor model all items load

directly on the general factor, rather than via lower-order factors as in a higher-order model. This type of model has found support in several instruments assessing anxiety and depression (6–8). In our own experience a bi-factor model fits the HADS better than a unidimensional, two-factor, or tripartite three-factor structure (9).

Crucially, since a bi-factor model allows the parsing of the general component of psychological distress along with the specific components of anhedonic depression and autonomic anxiety it reconciles conflicting findings across methods. Specifically, the presence of a general factor corresponds to the unidimensional structure of IRT studies and the negative affectivity factor in CFA studies. Furthermore, EFA studies also suggest the presence of a general factor since typically most items load highly on the first unrotated factor. However, rotating the factor solution to account for the expected correlation between anxiety and depression destroys this general factor.

Coyne and van Sonderen highlight other issues with the HADS, including the deliberate avoidance of somatic items and focus on anhedonia. However, the validity of the HADS has been shown to be acceptable. It has been shown to have good concurrent validity and diagnostic accuracy comparable to other tools (10,11). Issues with case finding– such as inflation of estimates due to varying cut-points and the failure to exclude already identified cases – these are not specific to the HADS. That the anxiety or total scores may also identify patients with depression is due to the hierarchical structure of anxiety and depression.

Another issue highlighted relates to the use of colloquialisms and potential disorientation caused by reversed wordings and varying response keys. Coyne and van Sonderen suggest this as a reason for anomalous factor loadings. However, items that have previously been identified as having anomalous loadings may load highly on the general factor. As such they may be good indicators of general distress rather than of autonomic anxiety or anhedonic depression. Supporting this view, a recent paper not included in Cosco et al's review examined the use of a methods factor to control for item wording effects (12). This too supported a tripartite like structure.

In summary, we believe the inconsistent findings with regard to the latent structure of the HADS may be reconciled by considering the reasons for the differences between methods and applying recent extensions of the tripartite theory to its structure. While the HADS has several other limitations, these are common across tools assessing symptoms of depression and anxiety. Revisions to item wording or response scales are common in other instruments, an undertaking for which the HADS is perhaps due.

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